

REMARKS

Upon entry of this Amendment, Claims 1, 3-14, and 20-25 will be pending in the application. Non-elected Claims 15-19 have been withdrawn from consideration by the Examiner.

In response to the drawing objection set forth in the Office Action, Applicants propose to amend Figs. 1-3, 6a and 6b to include the legend "Prior Art", as shown in red ink in the attached mark-up. Approval of the proposed drawing changes by the Examiner is respectfully requested.

Claims 1-6 and 8-13 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Nepela '533. Claims 7 and 14 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nepela '533. According to the Office Action, Nepela '533 shows a longitudinal recording head in Fig. 1 that includes: first and second poles P1, P2 defining a non-uniform gap 14, 16, 18; means for concentrating magnetic flux between the first and second poles in the vicinity of the gap (as the inherent operation of an inductive head with coil windings for inducing flux to bridge the magnetic gap 14, 16, 18 between the first and second poles P1, P2); the non-uniform gap comprises a cavity portion 14 that can be curved, as set forth at column 4, lines 22-26 of the reference. Applicants submit that the presently claimed invention is patentable over Nepela '533.

Independent Claim 1, as amended, recites a longitudinal recording head for use with a magnetic recording medium, the longitudinal recording head comprising: first and second poles defining a non-uniform gap comprising a hollow cavity; and means for concentrating magnetic flux between the first and second poles in the vicinity of the gap to produce a localized magnetic field in the magnetic storage medium. Some non-limiting examples of a hollow cavity as recited in Claim 1 are shown in Figs. 4, 7a, 7b, 8a, 8b and 10b, and described at page 4, lines 25-28 and page 7, lines 15-23 of the specification.

Nepela '533 does not teach or suggest a longitudinal recording head including a hollow cavity as recited in Claim 1. Instead, Nepela '533 discloses a magnetic recording head including a gap 14, 16, 18 which is "filled with an appropriate material, such as a nonmagnetic or other suitable material, for instance alumina (Al₂O₃)" (see column 2, lines 48-51). The gap 14, 16, 18 is made by depositing nonmagnetic material on the first pole P1 in two steps, followed by deposition of the second pole P2 over the nonmagnetic gap material

(see column 3, lines 17-30). Nepela '533 thus requires a filled gap rather than a hollow cavity as recited in Claim 1. Accordingly, Claim 1, and the claims that depend therefrom, are patentable over Nepela '533.

Independent Claim 8, as amended, recites a longitudinal recording head for use with a magnetic recording medium, the longitudinal recording head comprising: first and second poles; and a non-uniform gap defined by the first and second poles wherein portions of the first and second poles contact each other adjacent an air bearing surface of the recording head. Some non-limiting examples of first and second poles having portions which contact each other adjacent the air bearing surface of the recording head are shown in Figs. 4, 7a, 7b, 8a, 8b and 10b, and described at page 4, lines 25-28, page 7, lines 15-23 and page 7, line 28 to page 8, line 1 of the specification.

In contrast to the contacting pole arrangement recited in Claim 8, the magnetic recording head of Nepela '533 requires narrow gaps 16 and 18 between poles P1 and P2. As disclosed at column 2, line 61 to column 3, line 9 of Nepela '533, the narrow side gaps 16 and 18 are required in order to minimize side fringing between the poles P1 and P2, and to minimize crosstalk between adjacent recording tracks. Nepela '533 does not teach or suggest that the gaps 16 and 18 could be eliminated to allow the poles P1 and P2 to contact each other adjacent the air bearing surface of the recording head. Accordingly, the longitudinal recording head with the contacting pole arrangement recited in Claim 8 is patentable over Nepela '533.

Dependent Claim 9, which depends from Claim 8, has been amended to recite that the non-uniform gap comprises a hollow cavity. As discussed above in connection with Claim 1, Nepela '533 fails to teach or suggest such a hollow cavity.

Newly added Claim 20, which depends from Claim 1, recites that portions of the first and second poles contact each other adjacent an air bearing surface of the recording head. The features recited in dependent Claim 20 are similar to those recited in amended independent Claim 8. Claim 20 is therefore patentable over the prior art of record for the same reasons as noted above in connection with Claim 8.

Newly added dependent Claims 21 and 24, which depend from Claims 1 and 8 respectively, recite that the non-uniform gap has a length that is not constant along a dimension perpendicular to an air bearing surface of the recording head. Basis for this claim

language is provided in the specification, for example, at page 6, lines 10-13. Non-limiting examples of the recited non-uniform gap configuration are shown in Figs. 7a and 8a.

Although Nepela '533 discloses at column 4, lines 22-25 that the single-step side gaps 16 and 18 may alternatively comprise multiple steps having an arcuate configuration, such a modification refers to the cross-sectional shape of the gap, e.g., as illustrated in Fig. 2. No teaching or suggestion is provided that the gap 14, 16, 18 of Nepela '533 could have a length that is not constant along the dimension perpendicular to the air bearing surface of the recording head, e.g., as shown in Figs. 7a and 9 of the present application. Accordingly, dependent Claims 21 and 24 further distinguish over the prior art of record.

Newly added dependent Claims 22 and 25, which depend from Claims 1 and 8 respectively, recite that the cavity of the non-uniform gap comprises a volume from which material from the first pole and/or from the second pole has been removed. The basis for this language is provided in the specification, for example, at page 9, lines 5-7. A non-limiting example of a cavity comprising a volume of material removed from a first and/or second pole is shown in the photomicrograph of Fig. 12.

In contrast to a cavity formed by removing material from the first and/or second poles as recited in Claims 22 and 25, the gap 14, 16, 18 of Nepela '533 comprises a non-magnetic material deposited in a first layer (to form the side gaps 16 and 18, and a portion of the central gap 14) and a second layer (which forms the remainder of the central gap 14). The second pole P2 is then deposited over the non-magnetic gap material. No teaching or suggestion is provided that the gap 14, 16, 18 between the poles P1 and P2 of Nepela '533 can be formed by removing a portion of either of the poles P1 and P2. Instead, the gap 14, 16, 18 of Nepela must be filled with non-magnetic material. Accordingly, Claims 22 and 25 further distinguish over the prior art of record.

Newly added Claim 23, which depends from Claim 8, recites that the portions of the first and second poles contact each other at the air bearing surface of the recording head. Non-limiting examples of such an arrangement are shown in Figs. 4, 7b and 8b. In contrast, the poles P1 and P2 of Nepela '533 do not touch each other at the air bearing surface of the recording head (see Figs. 1 and 2). They are separated from each other by the gap 14, 16, 18. Accordingly, Claim 23 further distinguishes over the prior art of record.



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In view of the foregoing Amendments and remarks, it is submitted that Claims 1, 3-14 and 20-25 are patentable over the prior art of record. Accordingly, an early Notice of Allowance of this application is respectfully requested.

In the event that any outstanding matters remain in connection with this application, the Examiner is invited to telephone the undersigned at (412) 263-4340 to discuss such matters.

Respectfully submitted,

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